

**U.S. Department of Energy  
Oak Ridge Operations, Oak Ridge, Tennessee**

**FINDING OF NO SIGNIFICANT IMPACT FOR QUADRANT II  
CORRECTIVE MEASURES IMPLEMENTATION AT THE  
PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO**

**AGENCY:** Department of Energy

**ACTION:** Finding of No Significant Impact

**SUMMARY:** The U.S. Department of Energy (DOE) has prepared an environmental assessment (EA), DOE/EA-1459, for Quadrant II Corrective Measures Implementation at the Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio. Proposed corrective measures implementation activities at the two areas of concern, the X-701B Holding Pond and Retention Basins Area and the X-701B Contaminated Groundwater Area, include a wide range of corrective measures technologies and methods that were evaluated as part of the Quadrant II Corrective Action Study/Corrective Measures Study (CAS/CMS). These ranged from institutional controls to removal of all contaminated soil, subsurface piping systems installation, and installation of an engineered cap for the X-701B Holding Pond and Retention Basins. For the X-701B Groundwater Plume Area the potential corrective measures ranged from institutional controls to various combinations of ex-situ and in-situ treatment including bio- and phyto- remediation and steam stripping/electrical resistance heating with vapor extraction.

Because a decision has not been made regarding Ohio EPA and U.S. EPA's preferred corrective measure method, all of the reasonably foreseeable corrective measures were included in the proposed action for evaluating potential impacts. This bounded the analysis as reasonably as possible to assure Ohio EPA and U.S. EPA's preferred action has been assessed.

Based on the analyses in the EA, DOE has determined that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment, within the meaning of the *National Environmental Policy Act* of 1969 (NEPA), 42 U.S.C. Code §4321, et seq. Therefore, the preparation of an environmental impact statement (EIS) is not required, and the Department is issuing this Finding of No Significant Impact (FONSI).

**PUBLIC AVAILABILITY:** Copies of this EA and FOSNI are available from:

U.S. Department of Energy  
Public Reading Room  
230 Warehouse Road, Building 1916-T2  
Suite 300  
Oak Ridge, Tennessee 37831

U.S. Department of Energy  
Environmental Information Center  
3930 U.S. Rt. 23  
Perimeter Road  
Piketon, Ohio 45661

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FONSI DOE/EA-1459

**PUBLIC PARTICIPATION:** In November 2002, the DOE Oak Ridge Operations Office published a public notice in the local newspapers informing affected and interested stakeholders of its intention to implement corrective measures in Quadrant II at PORTS. Availability of the copies of the Environmental Assessment for review by the public was identified in this notification. Written comments were solicited from reviewers with the comment period being closed on December 6, 2002. Written responses to questions and comments submitted as a result of these reviews have been developed and utilized in the finalization of the EA. DOE's responses to all comments were provided directly to their originators.

**DESCRIPTION OF PROPOSED ACTION:** Under the proposed action, the following corrective measures may be used individually or in combination to reach remediation goals at the X-701B Holding Pond and Retention Basins Area:

#### **Institutional controls**

These alternatives describe land deed restrictions that limit residential and commercial land development and access controls to prevent exposure to contaminated soils. There are no remedial actions being conducted. Once the on-site presence of DOE/USEC has ceased, it may be difficult to control future activities and, therefore, there is an increased risk of potentially exposing future site personnel or the public. Activities associated with site cessation, such as development of land use controls, may require additional NEPA review.

#### **Minor soil removal**

This alternative involves the excavation of the X-701B Holding Pond and Retention Basins and then backfilling with clay material. The total amount of contaminated soil to be removed is estimated to be in the range of 81,000 ft<sup>3</sup> to 110,000 ft<sup>3</sup>. Plant administrative control would be implemented by requiring excavation permits before starting excavation activities. These permits would include information regarding requirements for appropriate personal protective equipment and requirements for proper disposal of any soil removed from the excavated area. Waste generated under this corrective measure would be primarily Low Level Radioactive and would require disposal at an authorized off-site treatment, storage, and disposal facility or an on-site disposal cell.

#### **Minor selective removal, and capping**

The X-701B Holding Pond and Retention Basins would be backfilled with clay to build up the existing topography in support of subsequent capping layers. The total amount of contaminated soil to be removed outside the capped area is estimated to be 270 ft<sup>3</sup> to 40,000 ft<sup>3</sup>. The caps will be engineered to meet RCRA Subtitles C and D and Ohio Hazardous Waste and Solid Waste requirements. The cap, combined with berms and ditches, would reduce water infiltration through the contaminated soil area and direct surface water around the perimeter of the cap and into the drainage ditch that flows into X-230J7 East Holding Pond.

Plant administrative control would be implemented by requiring excavation permits before starting excavation activities. These permits would include information regarding the type of soil contamination beneath the cap, requirements for appropriate personal protective equipment, requirements for proper disposal of any soil removed from the excavated area, and requirements for maintaining the cap in its original condition.

### **Extensive soil removal**

The X-701B Holding Pond and Retention Basins would be excavated to remove soil contaminants. The excavation would then be partially backfilled with clay and graded to drain into the existing drainage system. The X-701E Neutralization Building and several existing monitoring, injection and extraction wells in the area as well as the X-747G Precious Metal Scrap Yard may require relocation/demolition depending on the extent of excavation. The relocation/demolition of the X-747G yard, if necessary, would also require the disposal or relocation of the material currently stored in and around the yard as well as some adjacent structures and power poles. The total amount of contaminated material to be excavated under this scenario could range from 40,000 ft<sup>3</sup> (selective removal) to over 2,100,000 ft<sup>3</sup> (complete removal). As much as 80,000 ft<sup>3</sup> of the excavated material (primarily soil below the water table) is expected to be mixed (RCRA hazardous and Low Level Radioactive). The rest is expected to be Low Level Radioactive. Waste generated as a result of these actions will be disposed of at a treatment, storage and disposal facility licensed to handle this type of material.

Plant administrative controls would be implemented by requiring excavation permits before starting excavation activities. These permits would include information regarding requirements for appropriate personal protective equipment and requirements for proper disposal of any soil removed from the excavated area.

### **Removal of piping system**

The X-701B Holding Pond's existing pump and associated piping located within the holding pond and surrounding areas would be removed.

### **Construction of disposal cell with leachate collection**

The X-701B Holding Pond and Retention Basins would be excavated, including the removal of the existing pump and associated piping located within the holding pond and surrounding areas. The excavated material would be temporarily staged on-site and the resulting depression would be converted into an engineered disposal cell with an underlying liner system (including leachate collection) and engineered cap. The cap would be engineered to meet RCRA Subtitles C and D and Ohio Hazardous Waste and Solid Waste requirements. The cap, combined with berms and ditches, would direct surface water around the perimeter of the cap and into the drainage ditch that flows into X-230J7 East Holding Pond. The anticipated volume of excavated material to be placed into the disposal cell is approximately 470,000 ft<sup>3</sup>. This assumes selective removal of contaminated soil. If complete excavation of contaminated soil is chosen a much larger disposal cell would be needed or some combination of onsite and offsite disposal. This method would reduce further leaching of contaminants from the vadose zone by eliminating surface water infiltration.

Plant administrative controls would be implemented by requiring excavation permits before starting excavation activities. These permits would include information regarding the type of soil contamination beneath the cap, requirements for appropriate personal protective equipment, requirements for proper disposal of any soil removed from the excavated area, and requirements for maintaining the cell and cap in its original condition.

Under the proposed action, the following corrective measures may be used individually or in combination to reach remediation goals at the X-701B Groundwater Contamination Area:

### **Oxidant Injection**

Oxidant injection is the process of applying a chemical that will react with contaminants to render them innocuous. This technology may be used to treat the X-701B groundwater plume. One possible implementation scenario using this technology is the injection of dilute hydrogen peroxide in the western portion of the plume (west of Perimeter Road). Several groundwater extraction wells would be used to control the direction of groundwater flow.

### **Vacuum Enhanced Recovery**

Vacuum enhanced recovery (VER) is the process of extracting total fluids, both liquids and vapors, from a control well. Groundwater is extracted with the purpose of lowering the water table, exposing more of the contaminated soil to air, thus expanding the vadose zone. Air movement can be accomplished much more effectively than water movement in the subsurface so cleanup can progress more rapidly. VER is applied to remove volatile organic compounds, which easily transfer from the water phase or adsorbed phase on soils to the vapor phase. VER wells may be used to extract vapor and groundwater in the central portion of the plume (east of Perimeter Road).

### **Steam Stripping/electrical resistance heating**

Steam stripping is the process of heating contaminated soil and groundwater to vaporize volatile contaminants; thereby making extraction easier using standard vapor extraction techniques such as VER. The steam may be generated ex-situ and injected or steam can be generated in-situ using techniques such as the application of electrical voltage using electrodes to heat the water and/or contaminants to the boiling point. Subsurface vapor extraction wells would be used to remove steam and contaminant vapors as they are produced. A steam condenser would separate the mixture of soil vapors, steam, and contaminants extracted from the subsurface. This technique may be employed in areas where high concentrations of contaminants make other remediation measures less efficient.

### **Bioremediation**

Bioremediation is the process of degrading a contaminant in an aerobic environment through a cometabolic process. Bacteria use the carbon associated with organic contaminants as a food source resulting in the breakdown of the organic contaminant into non-toxic constituents. Additional material can be added to enhance the existing food source to induce biodegradation in an aerobic environment. One of the possible applications of this technology may be an upgrade of an existing groundwater treatment facility. For example, the X-624 Groundwater Treatment Facility currently treats groundwater collected at the X-701B IRM Interceptor Trench. This facility may be demolished and replaced with a new building and treatment system to be located near the existing facility. The new treatment system would replace the current air stripper with an aerobic biological treatment unit, which would be supported by new injection and extraction wells. Current treatment media and chemicals would be reused at other treatment facilities or disposed of utilizing existing waste disposal procedures.

### **Phytoremediation**

Trees would be planted in the eastern portion of the plume to promote phytoextraction of groundwater. Studies have shown that the root systems of the certain trees are capable of reaching depths significantly beyond the depth of the groundwater table in the vicinity of the X-701B Groundwater Plume Containment Trench, which is approximately 5 ft below land surface. The

trees absorb trace minerals and contaminants from the soil and groundwater. A portion of the volatile organic compounds (VOCs) is metabolized within the tree and the remainder is transpired through the bark and leaves. The transpired TCE vapor is rapidly degraded in the atmosphere by ultraviolet light. The sugars and oxygen provided by the tree serve as nutrients for bacteria in the soil. The bacteria, promoted by the tree growth, aid in the in situ biodegradation of contaminants around the tree roots. By breaking down organic contaminants, bacteria obtain carbon and energy to help sustain bacterial reproduction processes.

#### **Continue current groundwater treatment**

Basement sumps in the X-705 Decontamination Building would continue to pump groundwater to the X-622T Groundwater Treatment or a replacement facility and the X-701B Interim Remedial Measures (IRM) trench would continue to extract contaminated groundwater and pump to the X-624 Groundwater Treatment Facility or its replacement for the next 30 years (based on model simulation). The X-622T and X-624 Groundwater Treatment Facilities currently treat portions of the Quadrant II groundwater plumes using carbon absorption and an air stripping system.

#### **Replace existing groundwater treatment facilities with new treatment facilities**

The X-622T and X-624 facilities may be replaced with new facilities and equipment to allow continued support for corrective measures. These replacements may be necessary because the existing facilities, constructed in 1991, have reached the end of their normally expected useful life. If it is to be replaced, X-622T, which is a trailer-mounted unit, will be demolished. X-622T would be replaced with a new building and treatment system located approximately near the existing facility. The replacement facility would be built with an increase in treatment capacity and may require the installation of an additional extraction well (8 in. to 10 in. diameter) installed in the area of the 7-Unit Groundwater Plume. Modifications may also need to be made to the X-624 facility to allow continued operation in the future due to the age of the existing equipment. Current treatment media and chemicals would be reused in the new facilities or disposed of utilizing existing waste disposal procedures.

**ALTERNATIVES:** Because a range of alternative corrective measures was evaluated under the proposed action, the only alternate action considered to the proposed action was the no action alternative. Under the no action alternative, no treatment, containment, removal, or monitoring of the environmental media would be performed beyond what is currently being performed in Quadrant II. Access restrictions to PORTS in its current condition would continue at its present level. Although contaminant toxicity, mobility, and total volume may still be reduced through the natural processes of attenuation (i.e., dispersion, dilution, and adsorption), the time to reach acceptable levels would be extremely long (> 30 years). No monitoring effort would be included in this alternative beyond current levels. DOE would not be able to comply with its obligations under the Administrative Consent Order (ACO) agreement with the U.S. EPA and Ohio EPA. The no action alternative would allow short-term exposure risks to on-site workers to continue at present levels. The long-term exposure risk associated with this alternative may increase if either access restrictions or the present level of contaminant controls and monitoring were terminated in the future. Activities associated with site cessation, such as development of land use controls, may require additional NEPA review.

**ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION:** The impacts of the proposed action and alternatives were analyzed in the EA. All components of the proposed action were reviewed and appropriate consultations with agencies concerned with protection of wildlife,

threatened and endangered species, and cultural and historic resources were notified of the proposed action (Implementation of corrective measures at Quadrant II at the Portsmouth Gaseous Diffusion Plant). Through the application of best management practices and with the implementation of appropriate mitigation measures, potential adverse environmental impacts to soils, water resources, and ecological resources would be expected to be minimal.

The FONSI for the proposed action is based on the following factors which are supported by information and analyses in the EA.

#### **AIR QUALITY**

Local ambient air quality should be minimally affected by emissions from vehicle and equipment exhaust, fugitive dust from vehicle traffic, and disturbance of soils during construction. Off-gas treatment systems may be required for the VER/Steam Stripping/electrical resistance heating corrective measures but emissions from the treatment systems should be minimal. The demolition/replacement of existing facilities could also have a minor temporary effect. The extent of dust generation would depend on the level of construction activity and on soil composition and dryness, and the degree of dust suppression techniques employed. Air permits-to-install would be submitted to the Ohio Environmental Protection Agency for construction activities and the operation of the treatment equipment. These activities would not be expected to result in a noncompliance of air quality standards, have an adverse impact on air quality, or be detrimental to human health.

#### **GEOLOGY AND SOILS**

The activities associated with the proposed action would take place in areas previously disturbed by industrial development.

#### **WATER RESOURCES**

Spills of fuel, hazardous material, waste, or a sewer line leak could have adverse impacts on surface waters if not controlled or contained. Impacts would primarily be a change to the water quality, which could affect vegetation and aquatic biota. Soil impacts would be mitigated through the use of best management practices. Dikes also would be installed to mitigate any environmental damage that could result from spillage.

#### **FLOODPLAINS AND WETLANDS**

Floodplains, streams, and wetland areas would be avoided to the extent practicable, and there would be no disturbance of sediment or sensitive habitats.

#### **ECOLOGICAL RESOURCES**

No threatened and/or endangered species are known to be present within any areas proposed for the implementation of the Quadrant II corrective measures.

#### **CULTURAL RESOURCES**

The proposed action has been reviewed in accordance with Section 106 of the National Historic Preservation Act and 36 *Code of Federal Regulations* 800. On December 5, 2001, a letter of notification was transmitted to the Ohio State Historic Preservation Officer (SHPO) with a DOE determination that there would be no adverse effects on historical resources included or

eligible for inclusion on the National Register of Historic Places; and on January 30, 2002, a letter was received from the Ohio SHPO concurring with this determination. Copies of these letters are included in Appendix A of the EA.

### **SOCIOECONOMICS**

Socioeconomic impacts associated with the Quadrant II corrective measures implementation would have a minor impact on transportation; however, no other socioeconomic impacts, including Environmental Justice concerns, would result from this proposed action. Based on the absence of minority tracts relative to PORTS, disproportionate impacts to minority populations would not occur. Although many low-income populations are located in Pike County, no disproportionately high and adverse human health or environmental impacts to these populations are expected.

### **INFRASTRUCTURE AND SUPPORT SERVICES (Transportation and Utilities)**

Transportation impacts associated with the proposed action would be minimal. Impacts to transportation in the area would not require modification of roads or other infrastructure to accommodate additional traffic.

### **NOISE**

Noise impacts would be minimal from this proposed action. No sensitive noise receptor sites (e.g., picnic areas, playgrounds, churches) are located within or near PORTS.

### **HUMAN HEALTH AND SAFETY**

No unique occupational health and safety hazards would be posed by the proposed action. Falls, spills, vehicle accidents, confined-space incidents, and injuries from tool and machinery operation could occur, and similar hazards also would be present during construction activities. On-site occupational radiological exposures for subcontractors implementing any actions discussed in the EA would be similar to the doses estimated for on-site workers and would be kept below the 5000 mrem/yr limit for occupational exposures of radiation workers set by the NRC and DOE.

### **ACCIDENTS**

Accidents could occur during construction activities or operation of a new or existing facility or from operator error, equipment malfunction, or from natural phenomena. Transportation accidents also could occur but would be expected to be similar to those that could occur during normal operations at PORTS. The use of safety procedures, spill prevention plans, and spill response plans in accordance with state and federal laws would minimize the severity of potential impacts from accidents.

### **WASTE MANAGEMENT AND WASTE MINIMIZATION**

It is anticipated that a varying amount of solid waste, decontamination/groundwater solutions and construction debris would be generated as part of any of the alternatives evaluated in the EA. Regardless of the alternative(s) selected, waste generation, handling and disposal, including any pollution prevention and waste minimization practices, would be accomplished in accordance with established procedures and regulations.

## **CUMULATIVE IMPACTS**

The proposed action would have minimal cumulative impacts on local or regional air quality, surface water and groundwater resources, existing habitats and biota, socioeconomics, transportation, and public and occupational health. Cumulative impacts would be expected to be equal to or less than those that currently exist in and around PORTS.

Potential cumulative impacts that could occur from the proposed action to implement corrective measures in Quadrant II at PORTS were discussed in the EA. Detailed environmental impact analysis of many of the actions is beyond the scope of the EA and would be subject to separate NEPA review.

**DETERMINATION:** Based on the analyses of the EA, DOE has determined that the proposed action to implement corrective measures in Quadrant II at the Portsmouth Gaseous Diffusion Plant does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, an Environmental Impact Statement on the proposed action is not required.

Issued in Oak Ridge, Tennessee, this \_\_ day of \_\_\_\_\_, 2003.

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